MGE EPS 7000
and MGE EPS 8000

Single and Parallel Operation

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About this Manual

This manual is intended for the users of the MGE EPS 7000 and MGE EPS 8000 systems. It gives an introduction to the display interface and provides information on configuration, operation, maintenance, and troubleshooting of the system.

Companion Manuals

For additional information, see the following documents:

- MGE EPS Safety - 990-3514
- MGE EPS 7000 500 kVA 480 V Integrated Parallel Receiving and Unpacking - 990-5227
- MGE EPS 7000 500 kVA 480 V Integrated Parallel Installation - 990-5228
- MGE EPS 8000 555–800 kVA 480 V Integrated Parallel Receiving and Unpacking - 990-5209
- MGE EPS 8000 555–800 kVA 480 V Integrated Parallel Installation - 990-5205
- MGE EPS 8000 1000–1100 kVA 480 V Integrated Parallel Receiving and Unpacking - 990-5208
- MGE EPS 8000 1000–1100 kVA 480 V Integrated Parallel Installation - 990–5207

Find Updates to this Manual

You can check for updates to this manual on www.apc.com. Look for the latest letter revision (A, B etc.) of the manual.

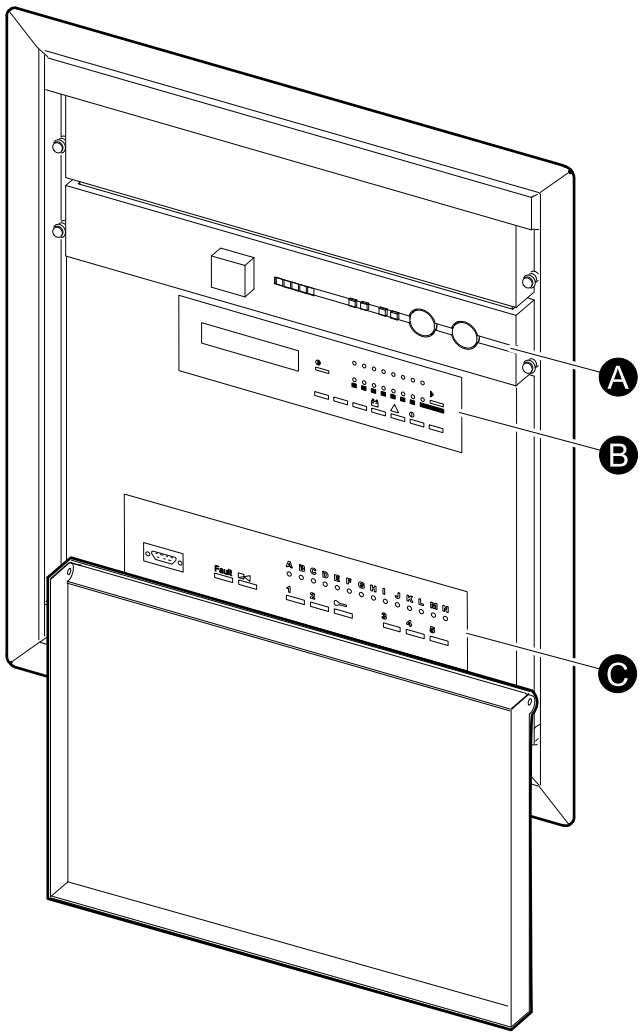
Overview

Breakers in the System

Breaker	Description
Q1	UPS input breaker: Isolates the UPS from the AC input source and provides input current protection.
Q5N	UPS/system output breaker (optional): Isolates the UPS/system from the connected load.
Q4S	Static bypass input breaker: Isolates the static switch from the AC bypass input source and provides back-feed protection.
Q2S	Wrap-around circuit breaker: Supplies the connected load via the AC bypass input source. SSC cabinet only.
Q3BP	Maintenance bypass circuit breaker (optional): Supplies the connected load via the maintenance bypass source while the UPS/SSC is being serviced.
QF1	Battery breaker: Disconnects the battery from the UPS and provides isolation and protection between the UPS and the battery system.

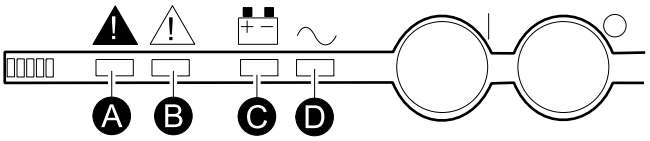
User Interface

A. Front panel
B. Alphanumeric display
C. Hidden panel



LED Indicators

Front Panel



A. Load not protected: When the LED is red, the system is in one of the following conditions:

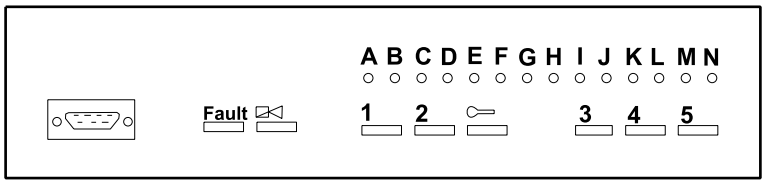
- The load is no longer protected following an inverter shutdown, or the opening of the UPS/system output breaker (Q5N).
- The battery breaker (QF1) is open, and the battery power is unavailable.

B. Operating problem: When the LED is orange, an operating problem exists. The UPS continues to protect the connected load.

C. Batteries: When the LED is orange, the batteries support the connected load partly or completely (battery operation).

D. Load protected: When the LED is green, the UPS supports the connected load, and the load is protected by the batteries (normal operation).

Hidden Panel



A. Emergency shutdown: Red LED indicates that the Emergency Power Off (EPO) or Remote Emergency Power Off (REPO) has been activated.

B. Rectifier/Charger on: Green LED indicates that the rectifier/battery charger is ON.

C. Rectifier/Charger fault: Indicates an alarm condition within the rectifier/battery charger.

D. Input outside tolerance: Orange LED indicates that the AC input source is outside voltage or frequency tolerance.

E. Reserved for future use.

F. Battery temp. outside tolerance: Orange LED indicates that the ambient temperature of the battery is too high or too low.

G. Battery charging: Orange LED indicates that the battery is being recharged. This function is only activated by lead-acid batteries (not sealed lead-acid batteries).

H. Inverter fault: Red LED indicates an alarm condition in the inverter.

I. Low batt. shutdown: Orange LED indicates that the battery has reached end-voltage following a discharge and is shutting down the inverter.

J. Inverter desynchronized: Orange LED indicates that the inverter is not synchronized with the bypass source.

K. Transfer fault: Red LED indicates a transfer fault.

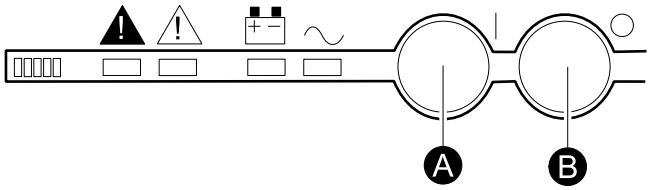
L. Overload: Orange LED indicates an overload alarm condition.

M. Bypass outside tolerance: Orange LED indicates that the AC bypass input source is outside voltage or frequency tolerance.

N. Maintenance position: Orange LED indicates that the breakers QF1, Q4S, Q5N, and Q3BP are set to maintenance bypass operation. The UPS is not available for load protection.

Keys

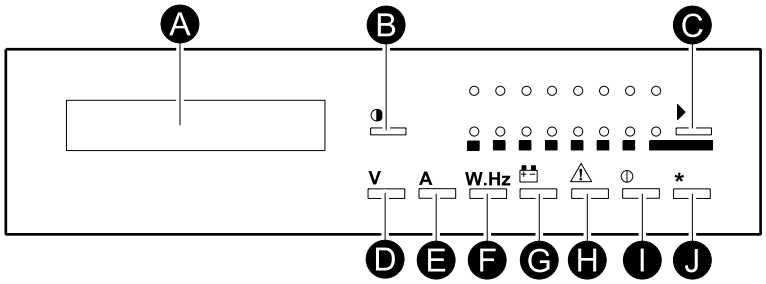
Front Panel



A. Inverter on: Starts the inverter.

B. Inverter off: Shuts down the inverter when continuously pressed for three seconds.

Alphanumeric Display



A. LCD display: Displays general status and operating parameters of the UPS.

B. Settings: Provides access to settings.

C. Selection: Used for selection, negative response, or other functions depending on the displayed message. In parallel systems, this key is primarily used for selecting which UPS or static switch cabinet the display communicates with.

D. Voltage: Provides access to voltage measurements.

E. Current: Provides access to current measurements.

F. Power/frequency: Provides access to power and frequency measurements.

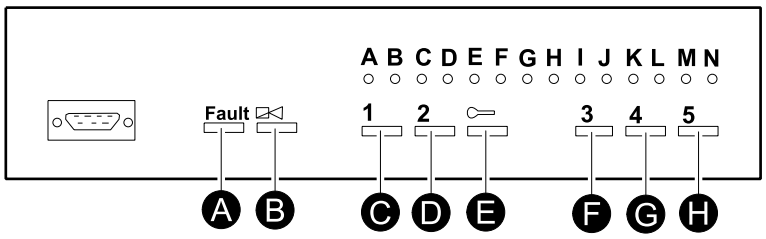
G. Battery: Provides access to battery measurements.

H. Alarms: Provides access to current or stored alarms.

I. On/Off: Reserved for future use.

J. Confirm/Verify: Used for confirmation, positive response, or other functions depending on the displayed message.

Hidden Panel



A. Clear fault log: Clears the alarms stored in the memory.

B. Alarm reset: Stops the audible alarm.

C. Battery charge cycle: Starts a battery charge cycle.

D. Return to float voltage: Forces the rectifier/battery charger back to the float voltage level during a battery charge cycle.

E. Security: Must be pressed simultaneously with any of the following keys. It helps guard inadvertent transfer of the load with interruption.

F. Inverter sync/desync: (While holding the **Security** key down) forces transfer of the inverter output to desynchronize/synchronize to the AC bypass input source.

G. Forced transfer (bypass to inverter): (While holding the **Security** key down) forces transfer of the load to the inverter output when the bypass is out of tolerance. The inverter must be on. A forced transfer requires a power interruption to the load of 0.8 seconds.

H. Forced shutdown (inverter to bypass): (While holding the **Security** key down) stops the inverter and transfers the load to the AC bypass source even if the bypass is out of tolerance. A forced transfer requires a power interruption to the load of 0.8 seconds.

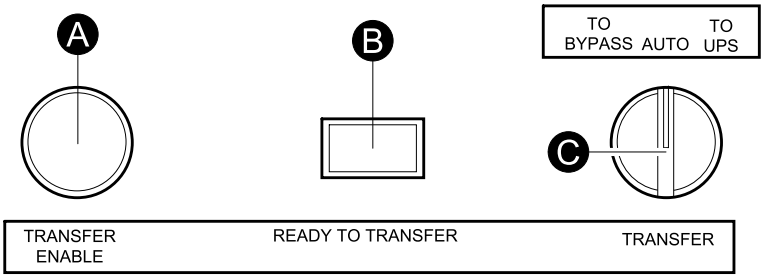
Simultaneous Inverter Transfer Control Panel

Note: This panel is only available in integrated parallel systems.

A. Transfer enable switch: Must be pressed simultaneously with turning the transfer switch to perform a transfer.

B. Ready to transfer LED: Green LED indicates that a simultaneous transfer can be performed.

C. Transfer switch: (While holding the transfer enable switch down) initiates transfer to either bypass or UPS.



Graphical User Interface

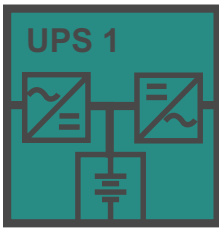
The Graphical User Interface functions as the monitoring program for your system. It will not be used for any control purposes.

Symbols

Circuit – Breaker

Bypass Static Switch

Inverter

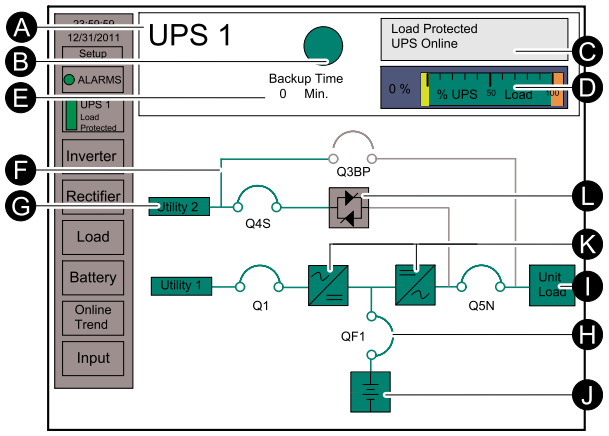


UPS

Rectifier/Charger

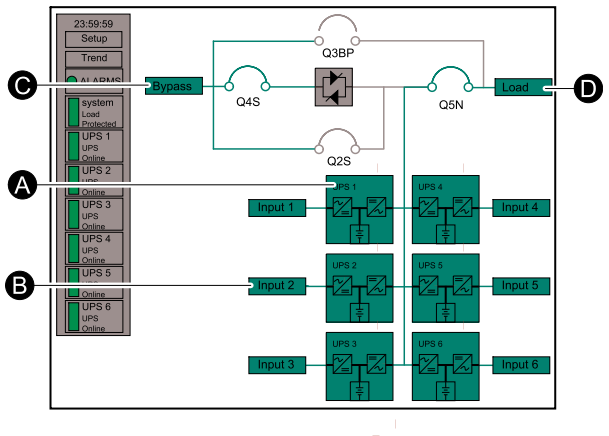
Main Menu Screen

Single



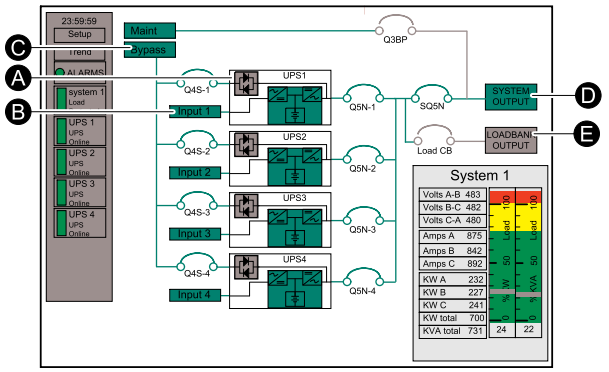
A. UPS name
B. Load Status Lamp
C. Status window
D. % load
E. Backup Time (in minutes)
F. Power path
G. Bypass input
H. Battery Circuit Breaker
I. Load utility
J. Batteries
K. Rectifier/Charger and Inverter
L. Bypass Static Switch

Parallel with Centralized Static Switch



A. UPS
B. Utility input
C. Bypass input
D. Load

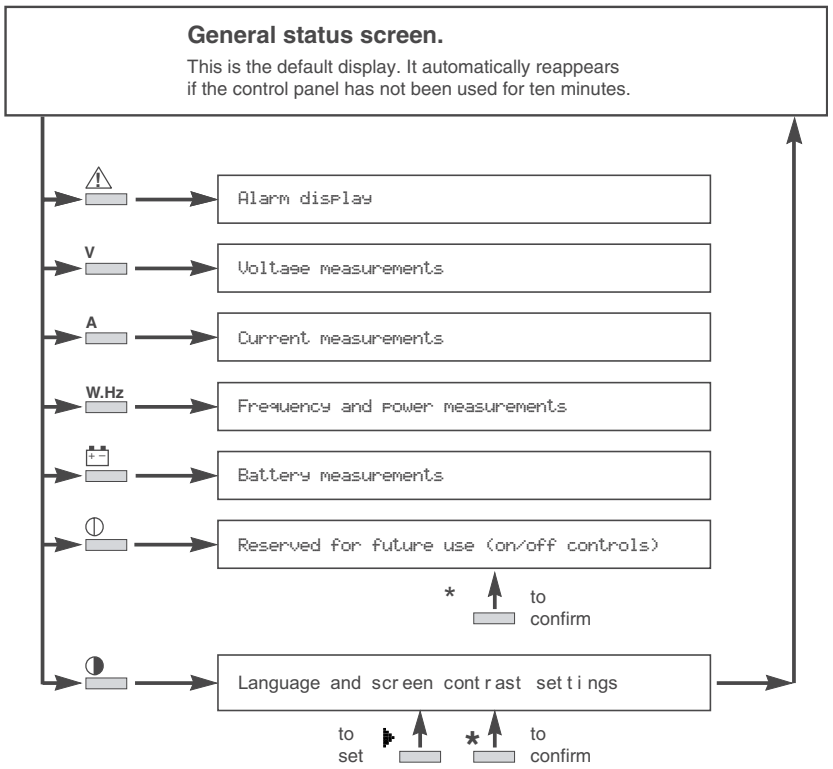
Integrated Parallel



A. UPS
B. Utility input
C. Bypass input
D. Load
E. Load bank

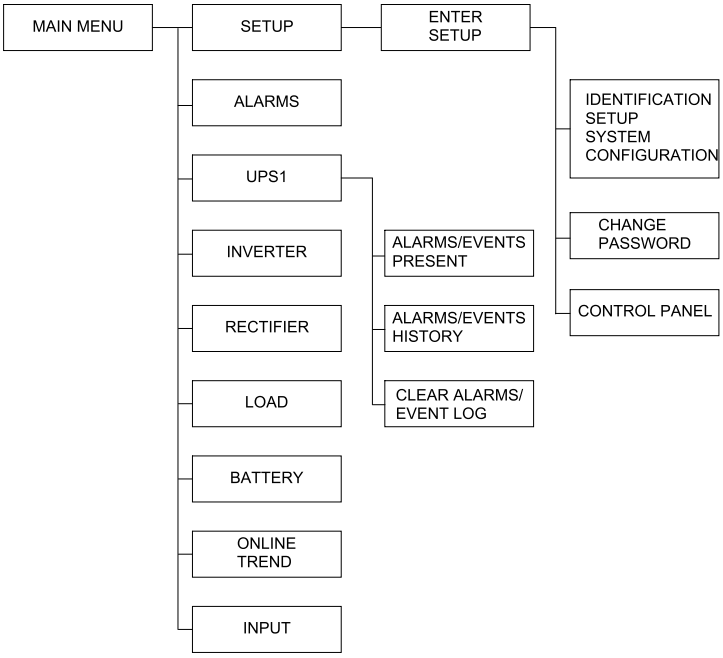
Menu Trees

Alphanumeric Display Menu Tree

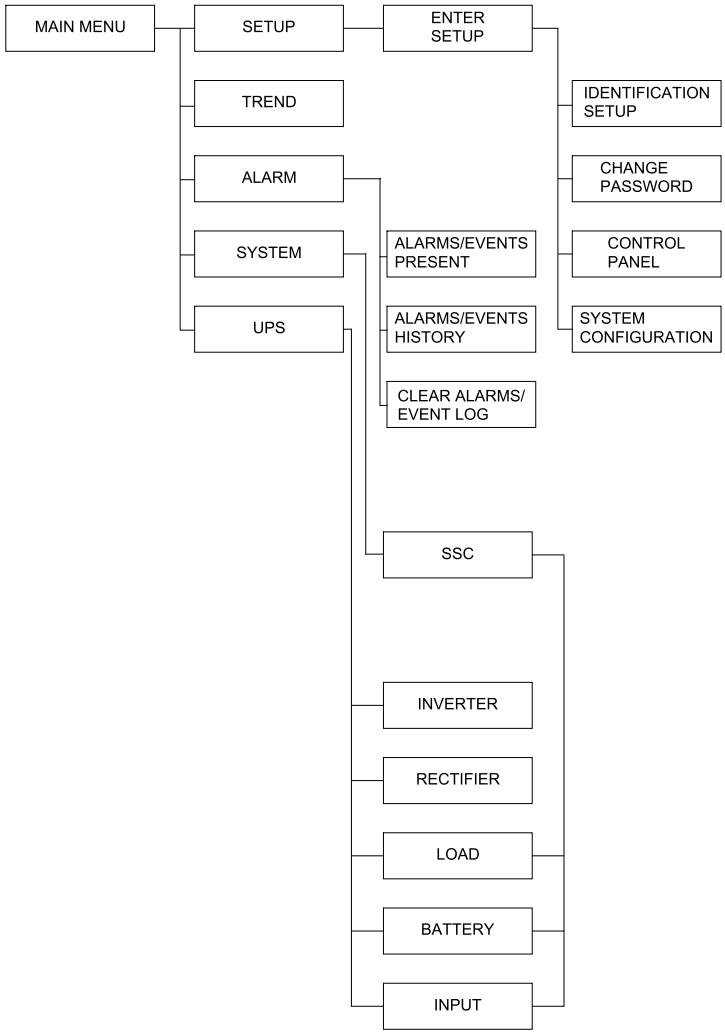


Graphical User Interface Menu Tree

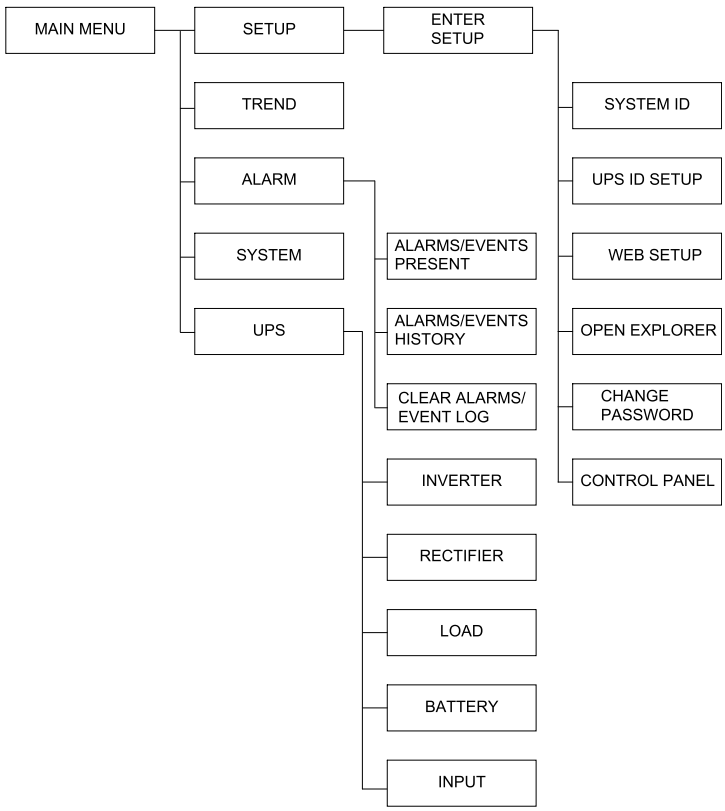
Single



Parallel with Centralized Static Switch



Integrated Parallel

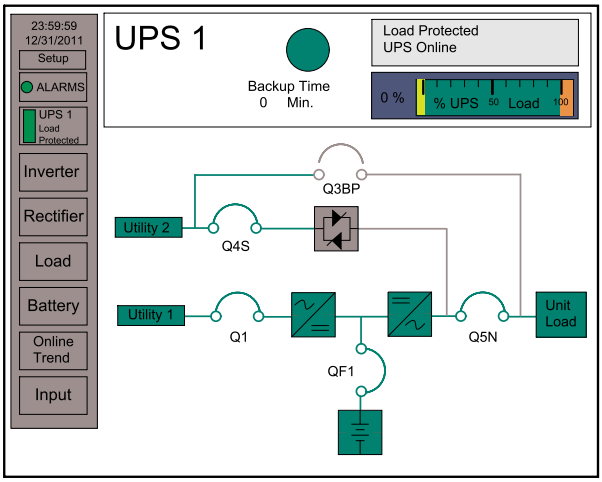


Operation Modes

Normal Operation

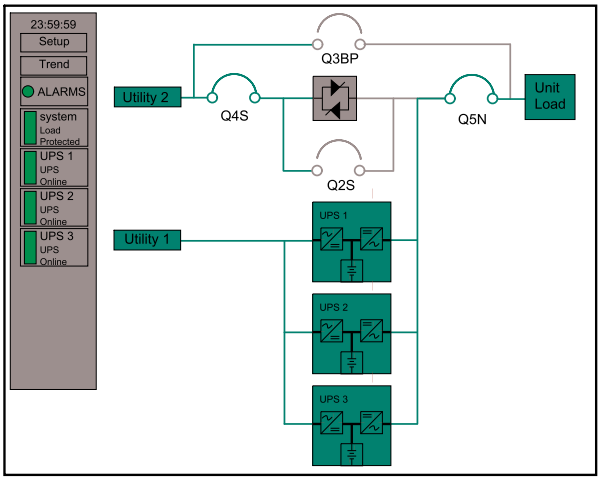
Single

During normal operation, the UPS supports the critical load with conditioned power. The green line indicates the power flow from the utility/mains through the UPS system and to the load.



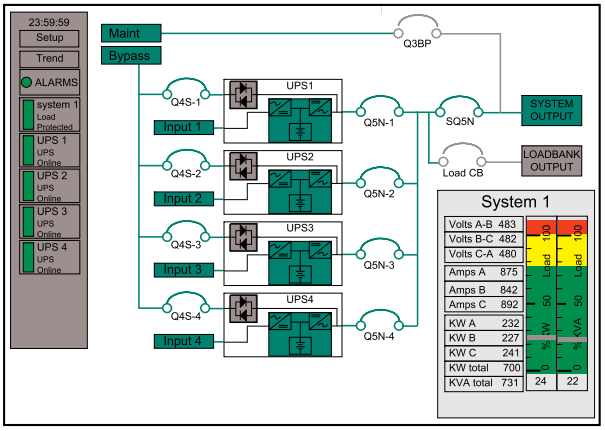
Parallel with Centralized Static Switch

During normal operation, the UPS supports the critical load with conditioned power. The green line indicates the power flow from the utility/mains through the UPS systems and the static switch cabinet to the load.



Integrated Parallel

During normal operation, the UPS supports the critical load with conditioned power. The green line indicates the power flow from the utility/mains through the UPS systems and the static switch cabinet to the load.



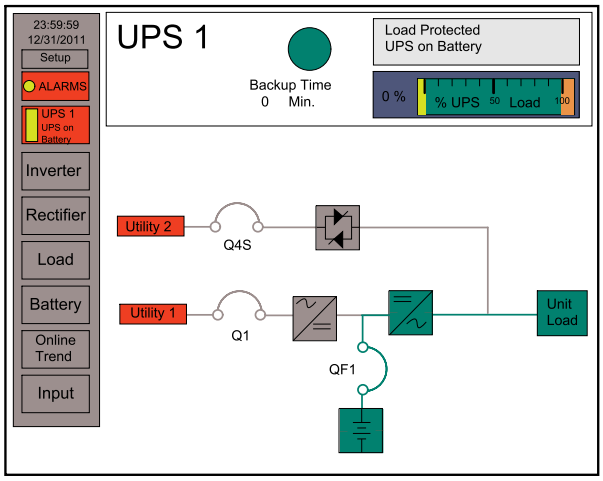
On-battery Operation

If the AC input supply fails or goes out of tolerance, the UPS transfers to on-battery operation. During on-battery operation, battery power ensures uninterrupted support to the critical load. When the AC input supply returns, the UPS automatically returns to normal operation.

If the batteries become depleted before the AC input supply returns, the attached load is transferred to the AC bypass supply if it is available.

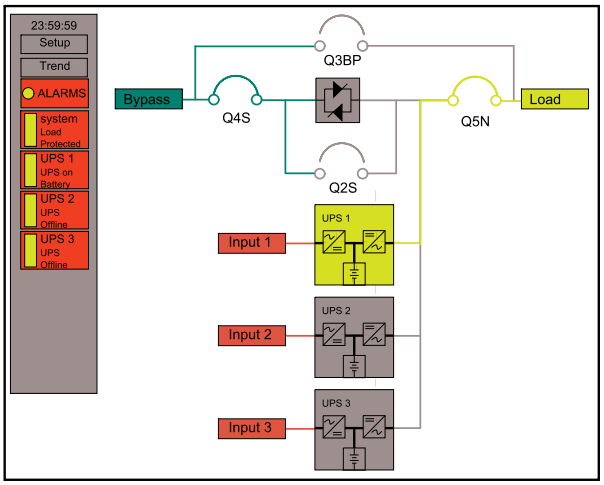
Single

The green line indicates the power flow from the batteries through the inverter and then to the load.



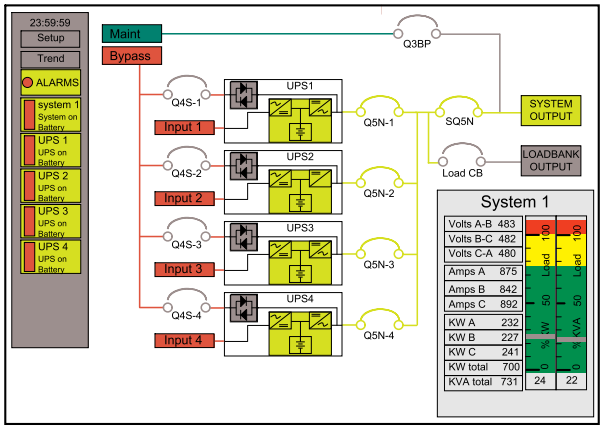
Parallel with Centralized Static Switch

The green/yellow line indicates the power flow from the batteries through the inverters and the static switch cabinet to the load. The yellow color indicates that the UPS is in battery operation.



Integrated Parallel

The green/yellow line indicates the power flow from the batteries through the inverters and the static switch cabinet to the load. The yellow color indicates that the UPS is in battery operation.

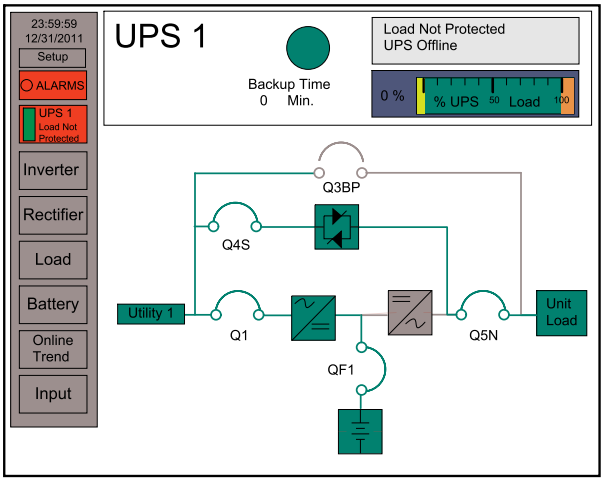


Static Bypass Operation

During bypass operation, the critical load is supplied by the bypass AC input supply via the static switch.

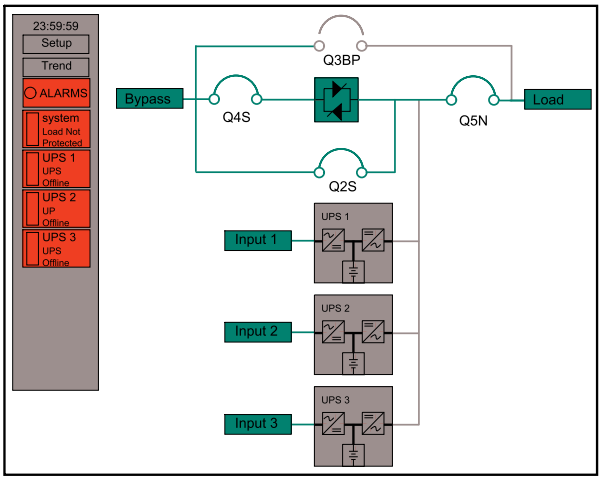
Single

The green line indicates the power flow from the bypass source through the static switch and to the load.



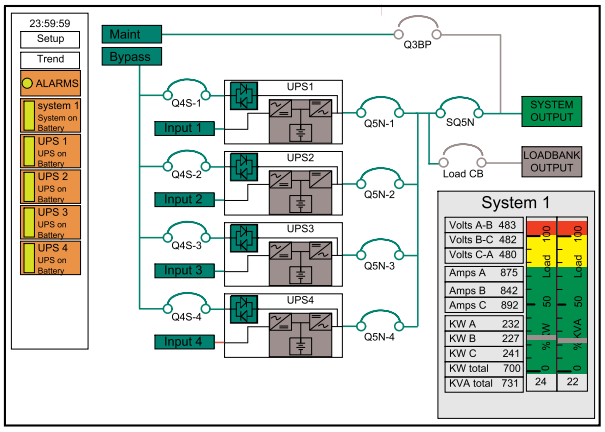
Parallel with Centralized Static Switch

The green line indicates the power flow from the bypass source through the static switch and to the load.



Integrated Parallel

The green line indicates the power flow from the bypass source through the static switch and to the load.



Maintenance Bypass Operation

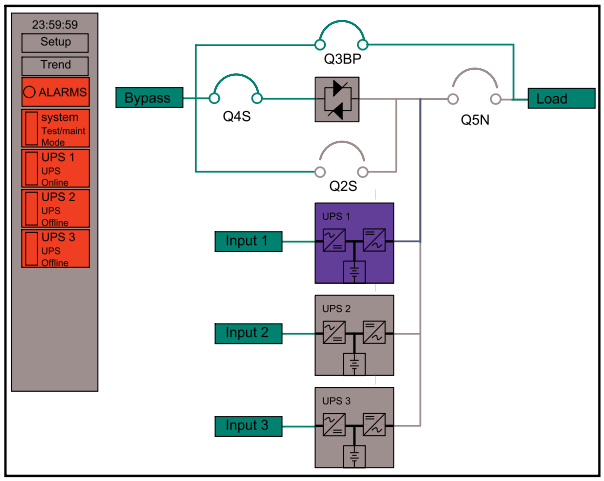
During maintenance bypass operation, the critical load is supplied directly by the utility/mains power. The static switch cabinet and the UPS are completely isolated. Batteries are not available as an alternate power source while the UPS system is in maintenance bypass operation.

Note: In single systems, the Graphical User Interface will be off when the UPS is in Maintenance Bypass Operation.

Testing UPS 1 in maintenance bypass operation

The green line indicates the power flow from the utility 2 supply through the Q3BP breaker and to the load.

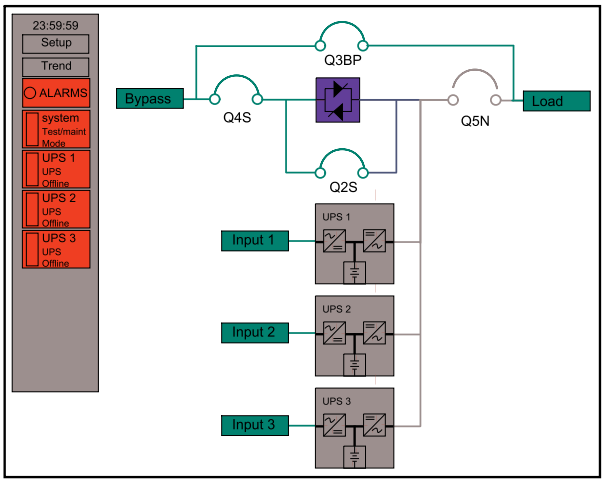
WARNING: Follow the procedure *"Parallel System Shut down from Normal to Maintenance Bypass Operation"* before performing maintenance on the UPS.



Testing the bypass switch in maintenance bypass operation

The green line indicates the power flow from the utility 2 supply through the Q3BP breaker and to the load.

WARNING: Follow the procedure *"Parallel System Shut down from Normal to Maintenance Bypass Operation"* before performing maintenance on the static bypass.

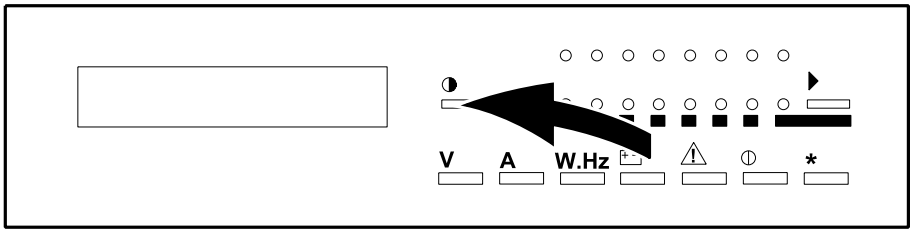


Configuration

User Interface

Set the Display Language and Contrast

1. On the alphanumeric display, press the **Settings** key to access the language selection menu.



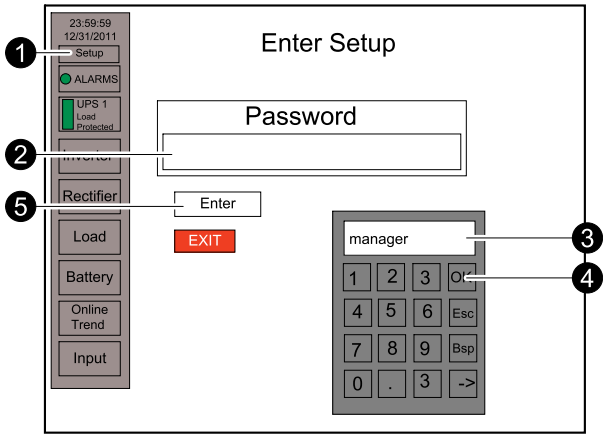
2. The display will scroll through the list of languages. Press * to confirm the language selection and access the contrast menu.
3. Press the arrow to go to the desired contrast level.
4. Press * to confirm the selected contrast and return to the general status screen.

Graphical User Interface

Access The Setup Screen

The default password is “manager”.

1. Press the **Setup** button.
2. Double-click on the **Password** field.
3. Type the password navigating through the keypads.
4. Press the **Ok** button.
5. Press the **Enter** button.

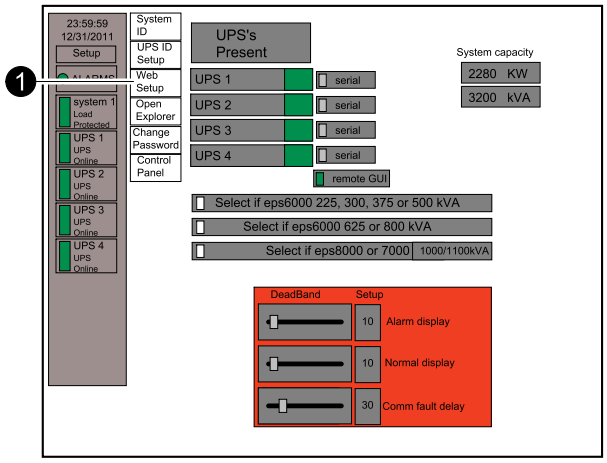


Set up Integrated Parallel Network

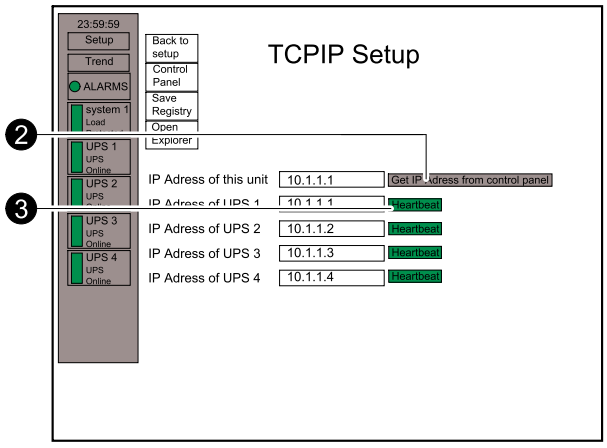
Note: You must have entered the identification setup screen to continue.

Caution: Each Graphical User Interface must have a unique IP adress, example given for UPS1.

1. Press the **Web setup** button.



2. Press the **Get IP adress from control panel** button.
3. Verify that the **Heartbeat** box is blinking.



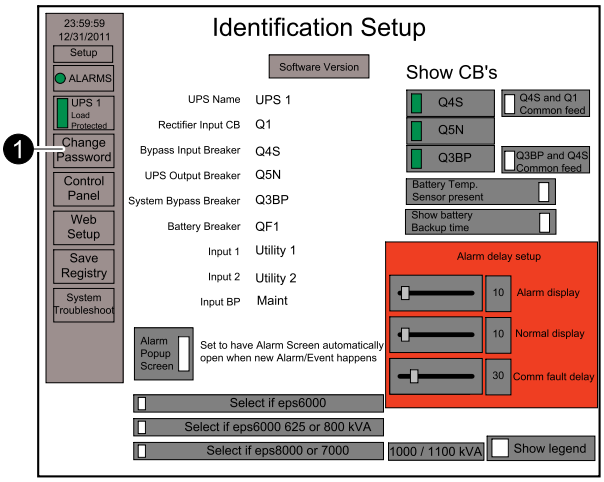
Change Password

Note: You must have entered the identification setup screen to continue.

The password has a maximum of 20 characters, lower case.

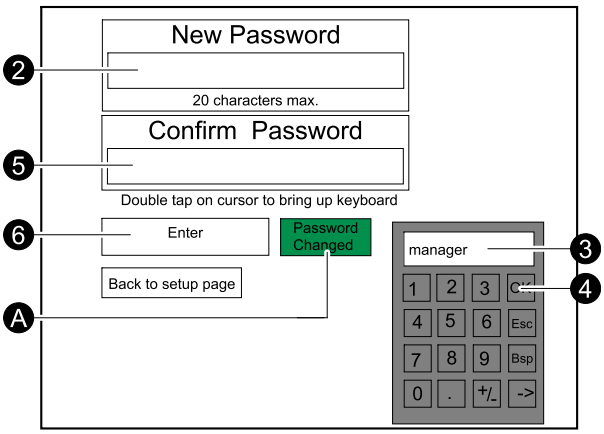
The example below shows the single module screen.

1. Press the **Change Password** button.



2. Double-click on the **New Password** field.
3. Type the password navigating through the keypads.
4. Press the **Ok** button.
5. Double-click on the **Confirm Password** field and type the new password once more following steps 3 and 4.
6. Press the **Enter** button.

   A. Once the password is changed, a **Password Changed** confirmation indicator is displayed.

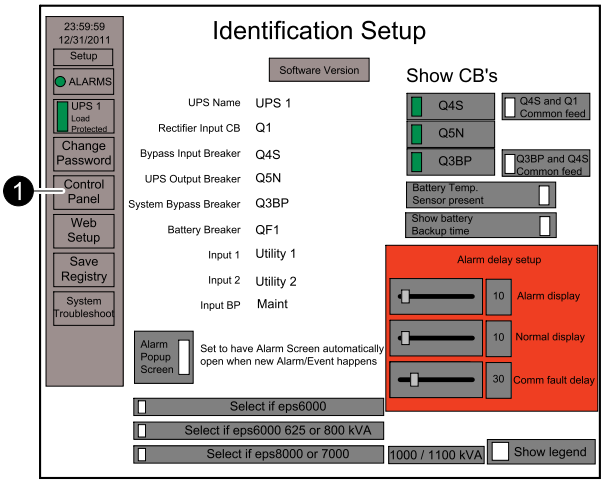


Change Date and Time

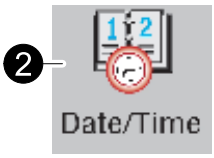
Note: You must have entered the identification setup screen to continue.

The example below shows the single module screen.

1. Press the **Control Panel** button.



2. Double-click on the **Date/Time** Button.
3. Change the date and time.



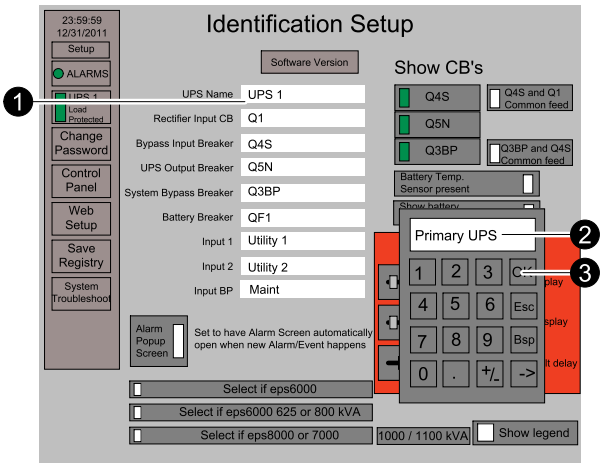
Rename UPS Units and Breakers

Note: You must have entered the identification setup screen to continue.

The example below shows the single module screen. For Integrated Parallel, the labels are located on the UPS ID Setup and System ID setup screens.

Example given for UPS. The principle is the same for all UPS units and breakers.

1. Double-click on the **UPS Name** field.
2. Type the password navigating through the keypads.
3. Press the **Ok** button.



Hide/Show Elements in a Single System

Note: You must have entered the identification setup screen to continue.

The elements that have a green bar will be shown – grey elements will not be shown.

The example below shows the Q4S breaker. The principle is the same for all elements.

1. Press the **Q4S** button to turn it green (show) or grey (hide):

   A. Hide/show Q4S and Q1 common feed.

   B. Hide/show Q3BP and Q4S common feed.

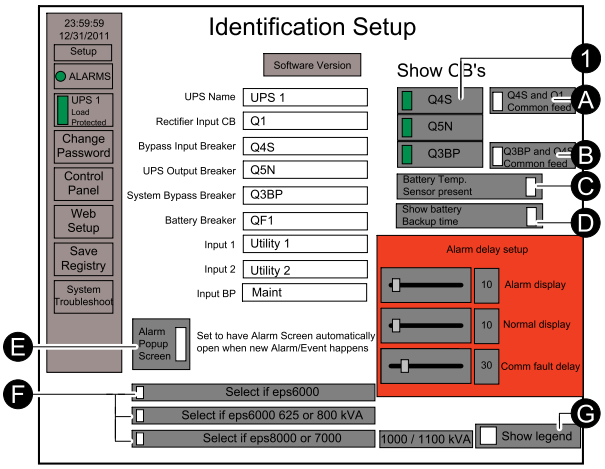
   C. Hide/show battery temperature sensor (option).

   D. Hide/show battery backup time. The battery parameters must be set correctly.

   E. Hide/show alarm popup screen. If set to show, a popup screen will appear for every new unacknowledged alarm. You can also hide/show the alarm popup screen in the Alarm/event screen.

   F. Hide/show UPS specific alarms.

   G. Hide/show power flow color code.



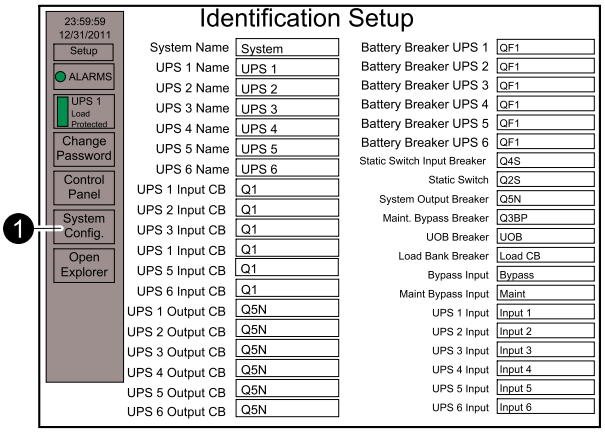
Hide/Show Elements in a Parallel System with Centralized Static Switch

Note: You must have entered the identification setup screen to continue.

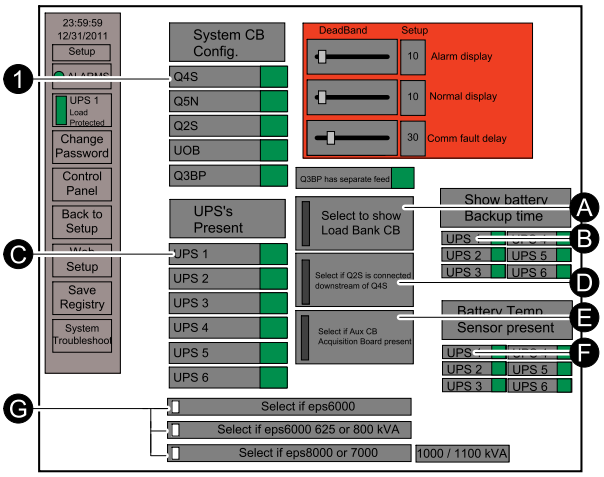
The elements that have a green bar will be shown – grey elements will not be shown.

The example below shows the Q4S breaker. The principle is the same for all elements.

1. Press the **System config** button.



2. Press the **Q4S** button to turn it green (show) or grey (hide):



A. Select if Load bank circuit breaker is present.

B. Hide/show battery backup time. The battery parameters must be set properly.

C. Hide/show number of UPS units in the system.

D. Hide/show Q2S connected downstream of Q4S.

E. Hide/show Static switch, Q2S, Load bank breaker and UOB breaker status.

F. Hide/show battery temperature sensor (option) if available.

G. Set the type of UPS system.

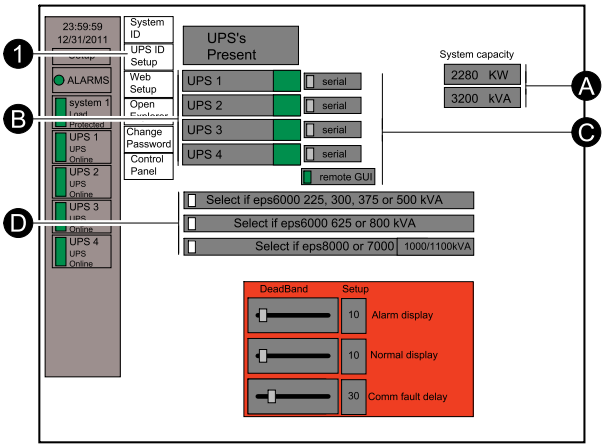
Hide/Show Elements in an Integrated Parallel System

Note: You must have entered the setup screen to continue.

The elements that have a green bar will be shown – grey elements will not be shown.

The example below shows the Q3BP breaker. The principle is the same for all elements.

1. Press the **UPS ID Setup** button.



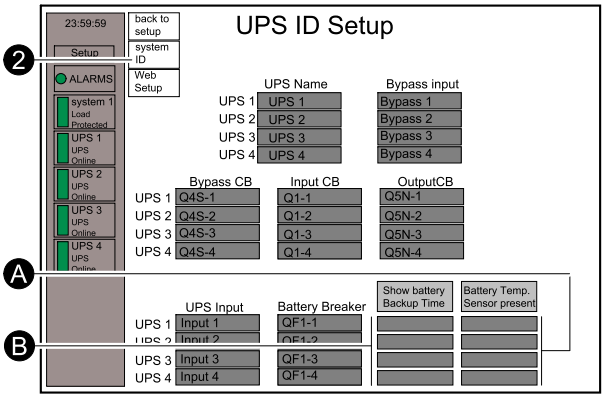
A. Identify the current UPS or remote GUI.

B. Hide/show number of UPS units in the system.

C. Hide/show system capacity.

D. Hide/show UPS specific alarms.

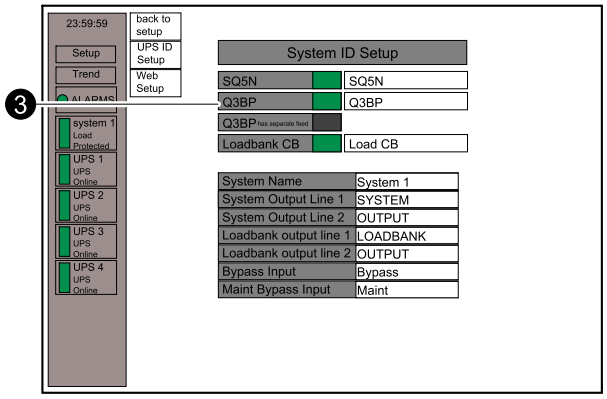
2. Press the **System ID** button.



A. Hide/show battery temperature sensor (option) if available.

B. Hide/show battery backup time. The battery parameters must be set properly.

3. Press the **Q3BP** button to turn it green (show) or grey (hide).



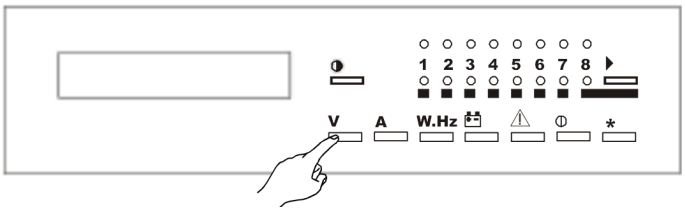
Operation Procedures

Access System Status Information from the User Interface

Voltage

Note: In parallel systems, bypass voltage measurements are shown in the static switch cabinet.

Press the **V** key on the alphanumeric display to shift between the different voltage measurements.



1. Press **V** key on the alphanumeric display to access AC input phase-to-phase in VAC RMS.

```
INPUT VAB VBC VCA
V RMS ___ ___ ___
```

2. Press **V** key on the alphanumeric display to access AC bypass input phase-to-neutral in VAC RMS.

```
BYPASS VAN VBN VCN
 V RMS ___ ___ ___
```

3. Press **V** key on the alphanumeric display to access AC bypass input phase-to-phase in VAC RMS.

```
BYPASS VAB VBC VCA
 V RMS ___ ___ ___
```

4. Press **V** key on the alphanumeric display to access inverter output phase-to-neutral in VAC RMS.

```
 INV. VAN VBN VCN
V RMS ___ ___ ___
```

5. Press **V** key on the alphanumeric display to access inverter output phase-to-phase in VAC RMS.

```
 INV. VAB VBC VCA
V RMS ___ ___ ___
```

6. Press **V** key on the alphanumeric display to access load phase-to-neutral in VAC RMS.

```
 LOAD VAN VBN VCN
V RMS ___ ___ ___
```

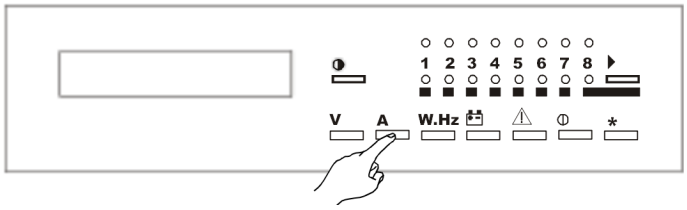
7. Press **V** key on the alphanumeric display to access load phase-to-phase in VAC RMS.

```
 LOAD VAB VBC VCA
V RMS ___ ___ ___
```

Current

Note: In parallel systems, bypass current measurements are shown in the static switch cabinet.

Press the **A** key on the alphanumeric display to shift between the different current measurements.



1. Press **A** key on the alphanumeric display to access AC input in AAC RMS.

INPUT	I1	I2	I3
A RMS	___	___	___

2. Press **A** key on the alphanumeric display to access AC bypass input in AAC RMS.

BYPASS	I1	I2	I3
A RMS	___	___	___

3. Press **A** key on the alphanumeric display to access inverter output in AAC RMS.

INV.	I1	I2	I3
A RMS	___	___	___

4. Press **A** key on the alphanumeric display to access load in AAC RMS.

LOAD	I1	I2	I3
A RMS	___	___	___

5. Press **A** key on the alphanumeric display to access information on the highest current drawn by a load phase relative to current rating.

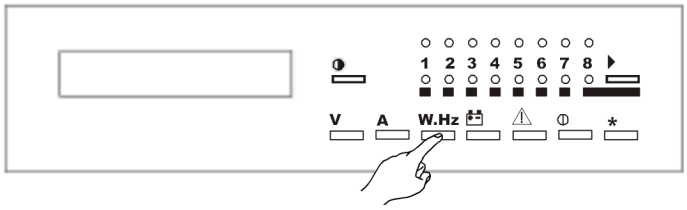
I LOAD / IN
=_% (IN=_A)

6. Press **A** on the alphanumeric display to access information on the load crest factor for each phase.

LOAD	I1	I2	I3
CREST F.	_-_	_-_	_

Power Frequency

Press the **W.Hz** key on the alphanumeric display to shift between the different power frequency and load measurements.



1. Press the **W.Hz** key on the alphanumeric display to access information on the frequency in Hertz for the AC input, AC bypass input, and inverter output.

```
FREQ. INP. BYP. INV.
HZ__-_ __-_ __-_
```

2. Press the **W.Hz** key on the alphanumeric display to access information on the real power drawn by the load in kW for each phase.

```
LOAD P1 P2 P3
KW __ __ __
```

3. Press the **W.Hz** key on the alphanumeric display to access information on the percentage of real power drawn by the load, relative to the rated output of the UPS or SSC.

```
P LOAD / Pn
= _% (PN=_ KW)
```

4. Press the **W.Hz** key on the alphanumeric display to access information on the apparent power in KVA drawn by the load for each phase.

```
LOAD P1 P2 P3
KVA __ __ __
```

5. Press the **W.Hz** key on the alphanumeric display to access information on the total real power (in kW) and the apparent power (in kVA) drawn by the load.

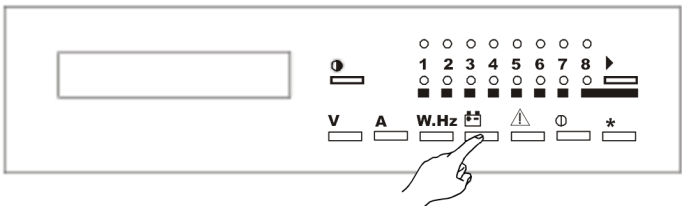
```
P. TOTAL P.KW P.KVA
LOAD _ _
```

6. Press the **W.Hz** key on the alphanumeric display to access information on the load power factor (real power divided by apparent power).

```
POWER FACTOR
LOAD P.F. = _-_
```

Battery

Press the **Battery** key on the alphanumeric display to shift between the different power battery measurements.



1. Press the **Battery** key on the alphanumeric display to access information on the battery voltage (VDC), the charge (+) or discharge (-) current (ADC), and the battery temperature (degrees Celsius).

```
VBAT. IBAT. T°BAT.
__V *__A__C
```

2. If the AC input source is available, press the **Battery** key on the alphanumeric display to display the amount of available battery backup time (in minutes) in the event of an AC input outage.

```
AVAILABLE BAT. TIME
__ MN %KV LOAD = _
```

3. If the AC input source is out of tolerance or unavailable, press the **Battery** key on the alphanumeric display to display the amount of remaining battery backup time (in minutes) for on-battery operation.

```
REMAINING BAT. TIME
__ MN %KV LOAD = _
```

Access System and Status Information from the Graphical User Interface

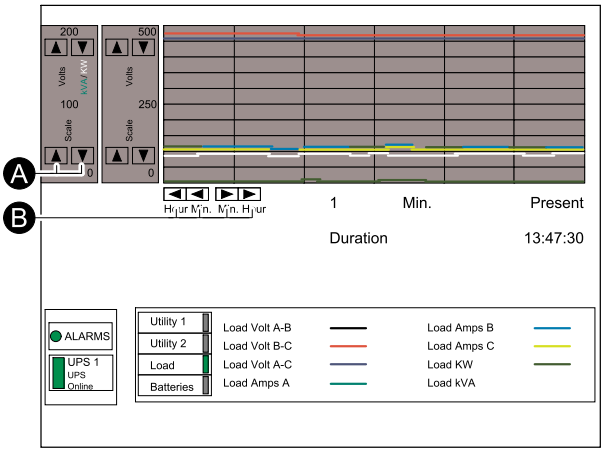
Access Online Trend Information

1. Press the specific UPS (this step is only applicable to parallel systems).
2. Press the **Online Trend** button.

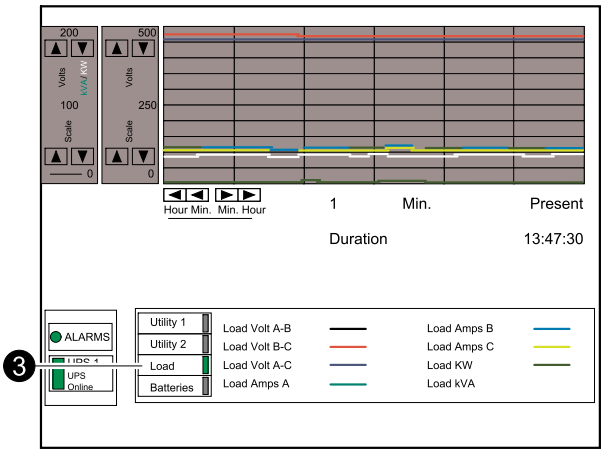
   The Online Trending screen displays voltage, current, kW and kVA information in a graphical format. It is possible to adjust:

   A. Volts, amperes, and kva/kW on the vertical scale.

   B. Time in minutes on the horizontal scale.



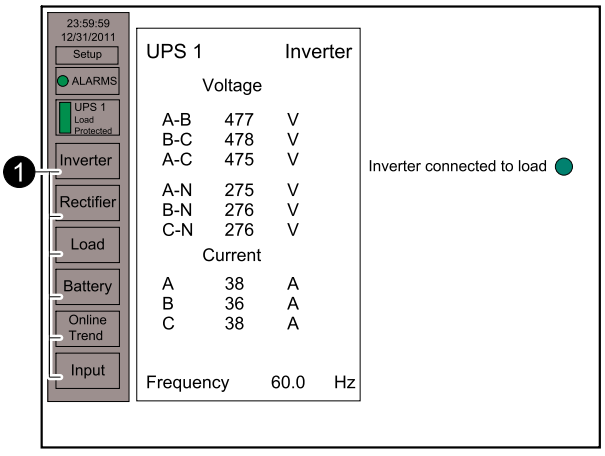
3. Press the Load, Utility 1, Utility 2, or Batteries buttons to see trend more information.



Access Monitoring Information

On a Single System

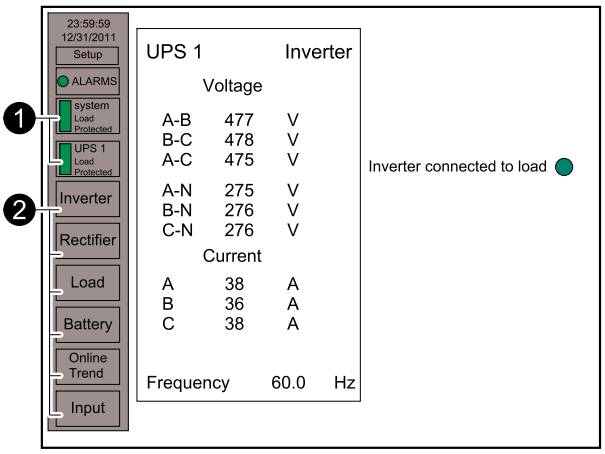
1. Press the parameter for which you wish to see monitoring information.



On a Parallel System with a Centralized Static Switch

You must be on the main menu screen.

1. Press either the **UPS** or **System** button. The UPS button gives access to information on Inverter, Rectifier, and Load measurements. The System button gives access to information on Load, Battery and Input measurements.
2. Select the parameter for which you wish to access monitoring information.

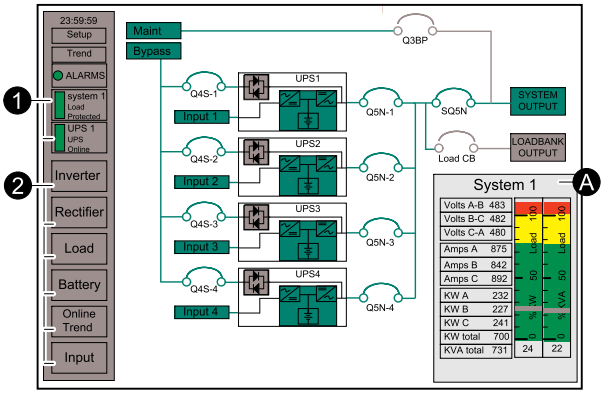


On an Integrated Parallel System

You must be on the main menu screen.

1. Press either the **UPS** or **System** button. The UPS button gives access to information on Inverter, Rectifier, and Load measurements. The System button gives access to information on Load, Battery and Input measurements.
2. Select the parameter for which you wish to access monitoring information.

   A. System load informations.



Perform a Total Power Off

WARNING: Pressing the emergency power off (EPO) key disconnects the attached load. The EPO is to be used during emergency situations only (if provided), where a hazard to personnel or equipment exists. Do not use the EPO for normal shutdown of the UPS.

1. Press the optional EPO key on the front panel of the UPS or the remote EPO key located in the room.

Uninterrupted Transfer Conditions

To transfer the load between the UPS unit and the bypass source without interruption, the following conditions must be met:

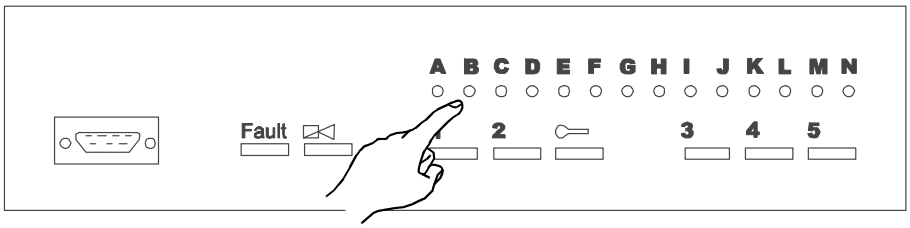
- The inverter output and bypass input must be synchronized.
- The bypass AC input voltage must be within 10% of nominal voltage.
- The bypass AC input frequency must be within specified tolerance.

Provided that both the UPS unit and the bypass AC input sources meet these conditions, uninterrupted transfers can take place. If these conditions are not met, transfers cannot take place without interruption to the load and a forced transfer is required (see ***"Forced Transfers"*** for more information).

Single System Start up from Off/Maintenance Bypass Operation

Note: If the system does not include the maintenance bypass option, start-up only requires that you close the static bypass input breaker (Q4S) to supply the bypass source to the connected load.

1. Close the upstream circuit breaker supplying power to the static bypass input breaker (Q4S).
2. Close the upstream circuit breaker supplying power to the UPS input breaker (Q1).
3. Close the optional maintenance bypass circuit breaker (Q3BP) if present. The load is now supplied by the bypass source.
4. Close the static bypass input breaker (Q4S). The static switch will come on-line, and the fans will start.
5. Close the UPS output breaker (Q5N) if present.
6. Open the maintenance bypass circuit breaker (Q3BP) if present.
7. Close the UPS input breaker (Q1) and verify the following (if these conditions are not present, there is a fault in the system. Open the UPS input breaker (Q1) and contact Customer Support):
   A. The red **Load not protected** LED is on.
   B. The rectifier/battery charger automatically starts.
8. Verify that the green LED **B** (rectifier/charger on) is lit.



9. Close the battery breaker (QF1). The batteries are now connected to the rectifier/battery charger and have started to recharge. As standard, the UPS is programmed for automatic restart, and the inverter will automatically start after the battery breaker (QF1) has been closed. If the UPS is not programmed for automatic restart, press the **Inverter on** key. The green **Load protected** LED will flash for about three seconds, indicating that the inverter is starting.
10. The UPS will automatically transfer the load to the UPS inverter output. The green "load protected" LED will turn on and remain on.

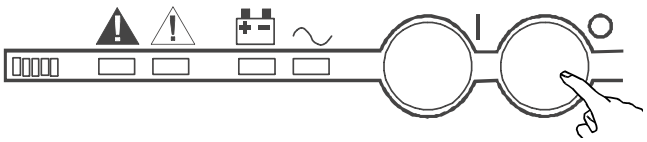
Note: If the transfer conditions are not satisfied (bypass AC input source is out of tolerance) a forced transfer is required.

Single System Shut Down from Normal to Maintenance Bypass Operation

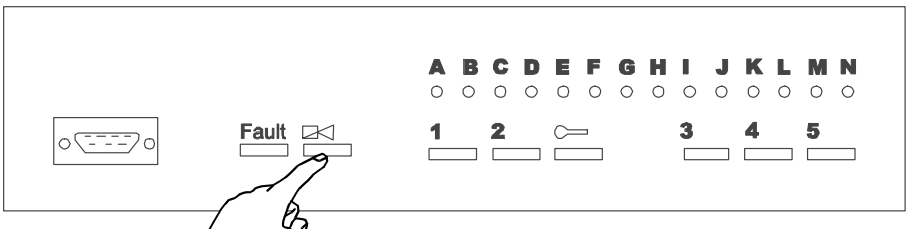
Caution: If the inverter is not synchronized with the bypass input, the procedure will result in a power interruption to the load.

Note: If the inverter does not turn off after step 1, proceed to do a forced transfer. See ***"Forced Transfers"***.

1. Stop the inverter by pressing the **Inverter off** key for three seconds. The alarm will sound.



2. On the hidden panel, silence the alarm by pressing the **Audible alarm reset** key.



3. Close the maintenance bypass circuit breaker (Q3BP) if available.
4. Open the UPS output breaker (Q5N). The load is now supplied by the maintenance bypass source.
5. Open the static bypass input breaker (Q4S).
6. Open the battery breaker(s) (QF1).
7. Open the UPS input breaker (Q1).
8. For complete protection, the upstream circuit breaker(s) supplying the UPS must be opened, locked, and tagged out while the UPS is being serviced. The UPS is now isolated for maintenance.

Caution: If the power to Q1, Q4S, and Q3BP is supplied from the same upstream circuit breaker, this step will interrupt the power to the load.

Parallel System Start up from Off/Maintenance Bypass Operation

Note: If the installation does not include the maintenance bypass option, start-up only requires that you close the static bypass input breaker (Q4S) to supply the bypass source to the SSC. All other functions are fully automatic.

1. Close the upstream circuit breaker supplying power to the static bypass input breaker (Q4S) and close the upstream circuit breaker supplying power to the optional maintenance bypass input (if present).
2. Close the upstream circuit breaker supplying power to the UPS input breaker (Q1).
3. Start the SSC:

A. Close the optional maintenance bypass circuit breaker (Q3BP) if present. The load is now supplied by the maintenance bypass source.

B. Close the static bypass input breaker (Q4S). The SSC will come on-line, and after about ten seconds the wrap-around circuit breaker (Q2S) will automatically close.

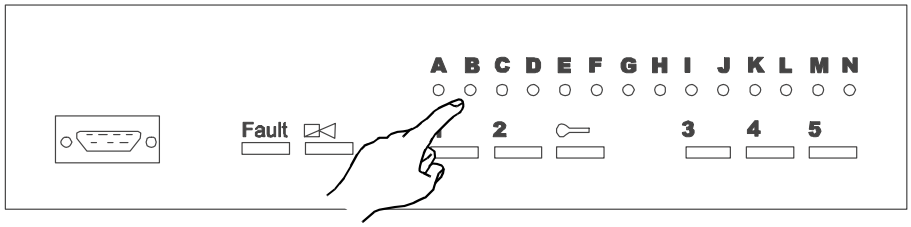
C. Close the optional system output breaker (Q5N) if present.

D. Open the optional maintenance bypass circuit breaker (Q3BP) if present. The SSC is now on-line, and the load is supplied by the bypass source.

4. Start up all UPS units in the system:

A. Close the UPS input breaker (Q1) and verify the following (if these conditions are not present, there is a fault in the system. Open the UPS input breaker (Q1) and contact Customer Support):
–The red **Load not protected** LED is on.
–The rectifier/battery charger automatically starts.

B. Verify that the green LED **B** (Rectifier/Charger on) is lit.



C. Close the UPS output breaker (Q5N). The fans in the UPS will start.

D. Close the battery breaker (QF1). The batteries are now connected to the rectifier/battery charger and have started to recharge. As standard, the UPS is programmed for automatic restart, and the inverter will automatically start after the battery breaker (QF1) has been closed. If the UPS is not programmed for automatic restart, press the **Inverter on** key. The green **Load protected** LED will flash for about three seconds, indicating that the inverter is starting.

E. As soon as a sufficient number of UPS units have been started, the SSC will automatically transfer the load to the UPS unit output. On each UPS unit, the green **Load protected** LED will turn on and remain on. On the SSC, the green **Load protected** LED will turn on.

F. As the remaining UPS units are turned on, their respective green **Load protected** LEDs will flash for three seconds, then remain on as the modules connect to the load. The load is equally shared between the UPS units.

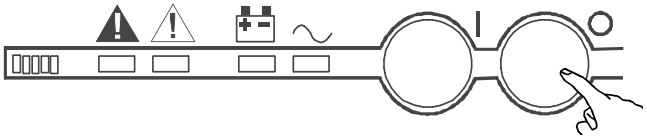
Note: If the transfer conditions are not satisfied (bypass AC input source is out of tolerance) a forced transfer is required.

Parallel System Shut down from Normal to Maintenance Bypass Operation

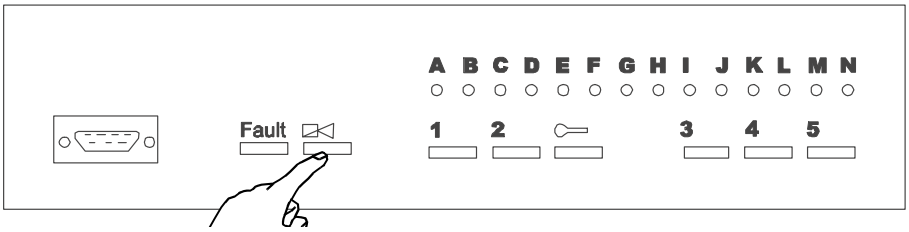
Caution: If the inverter outputs are not synchronized with the bypass input, the procedure will result in a power interruption to the load.

Note: If the inverter does not turn off after step 1, proceed to do a forced transfer. See ***"Forced Transfers"***.

1. Stop the inverter of each module by pressing the **Inverter off** key for three seconds. The alarm will sound.



2. On the hidden panel, silence the alarm by pressing the **Audible alarm reset** key.



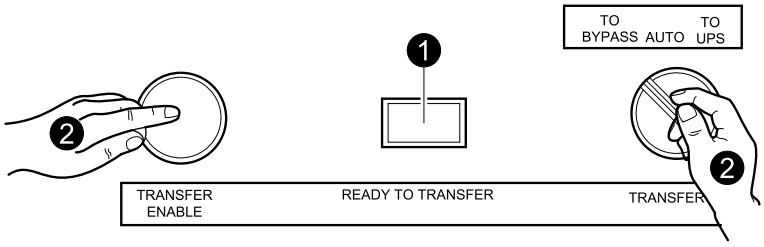
3. Close the maintenance bypass circuit breaker (Q3BP) if available. The load is now supplied by the maintenance bypass source.
4. Shut down all UPS units:
   A. Open the UPS output breaker (Q5N).
   B. Open the battery breaker(s) (QF1).
   C. Open the UPS input breaker (Q1).
5. Open the static bypass input breaker (Q4S).
6. For complete protection, the upstream circuit breaker(s) supplying the UPS and SSC must be opened, locked, and tagged out while the UPS is being serviced. The UPS is now isolated for maintenance.

Caution: If the power to Q4S and Q3BP is supplied from the same upstream circuit breaker, this step will interrupt power to the load.

Perform a Simultaneous Transfer to Static Bypass Operation

Note: This procedure is only applicable to integrated parallel systems and will transfer the load of each UPS to the bypass source.

1. Verify that the green **Ready to transfer** LED is lit.
2. Press and hold down the **Transfer enable** switch and turn the **Transfer switch** to the **To bypass** position.

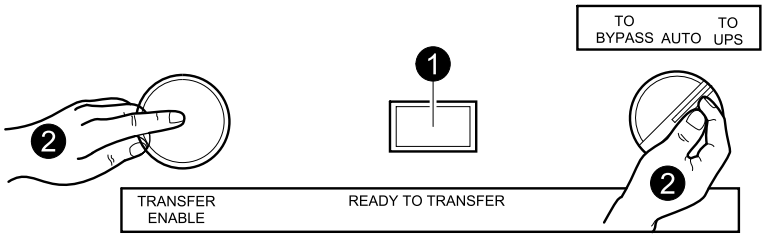


3. Release the two switches.

Perform a Simultaneous Transfer to Normal Operation

Note: This procedure is only applicable to integrated parallel systems and will transfer the load of each UPS to the conditioned source.

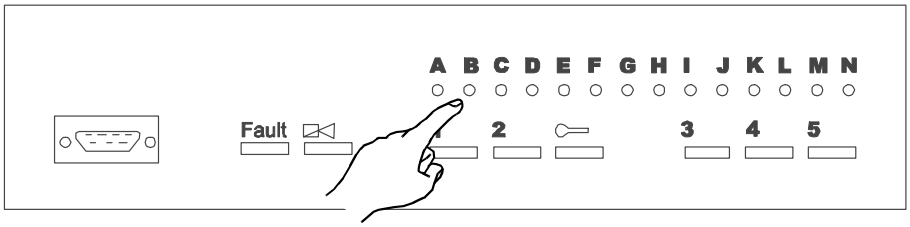
1. Verify that the green **Ready to transfer** LED is lit.
2. Press and hold down the **Transfer enable** switch and turn the **Transfer switch** to the **To UPS** position.



3. Release the two switches.

Start up of one UPS Unit in a Parallel System

1. Close the UPS input breaker (Q1) and verify the following (if these conditions are not present, there is a fault in the system. Open the UPS input breaker (Q1) and contact Customer Support):
   A. The red **Load not protected** LED is on.
   B. The rectifier/battery charger automatically starts.
2. Verify that the green LED **B** (rectifier/charger on) is lit.



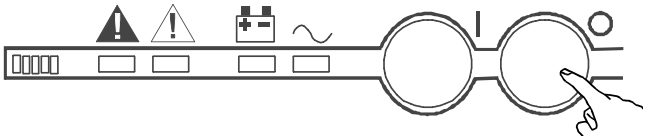
3. Close the UPS output breaker (Q5N). The fans in the UPS will start.
4. Close the battery breaker (QF1). The batteries are now connected to the rectifier/battery charger and have started to recharge.
   As standard, the UPS is programmed for automatic restart, and the inverter will automatically start after the battery breaker (QF1) has been closed. If the UPS is not programmed for automatic restart, press the **Inverter on** key. The green **Load protected** LED will flash for about three seconds, indicating that the inverter is starting.
5. As soon as a sufficient number of UPS units have been started, the SSC will automatically transfer the load to the UPS unit output. On each UPS unit, the green **Load protected** LED will turn on and remain on. On the SSC, the green **Load protected** LED will turn on.

Note: If the transfer conditions are not satisfied (bypass AC input source is out of tolerance), a forced transfer is required. See ***"Forced Transfers"***.

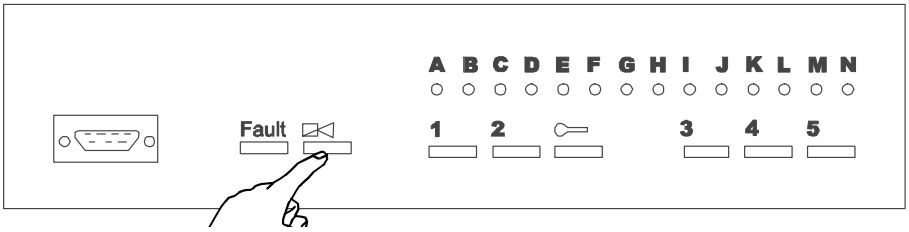
Shut down one UPS Unit in a Parallel System

Caution: Before isolating an individual UPS unit, ensure that the remaining UPS units can support the load. When one UPS unit is shut down, it may cause an overload or current-limiting condition if the remaining units are unable to fully support the connected load. The remaining UPS units may shut down immediately or after a certain time (depending on the load level), and the load may be transferred to the bypass source.

1. Stop the inverter by pressing the **Inverter off** key for three seconds. The alarm will sound.



2. On the hidden panel, silence the alarm by pressing the **Audible alarm reset** key.
   – If the transfer conditions are not satisfied (bypass out of tolerance), a forced transfer will be required. See ***"Forced Transfers"***.



3. Open the UPS output breaker (Q5N).
4. Open the battery breaker(s) (QF1).
5. Open the UPS input breaker (Q1).
6. For complete protection, the upstream circuit breaker supplying the UPS unit must be opened, locked, and tagged while the UPS is being serviced. The UPS unit is now isolated for maintenance.

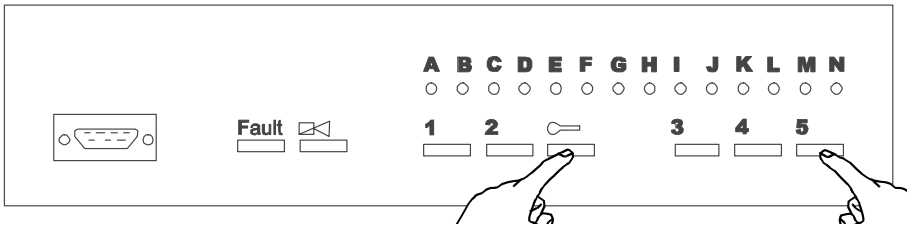
WARNING: Power will still be present on one side of Q5N, fed back from the SSC.

Forced Transfers

Forced Transfer from Normal to Static Bypass Operation

Caution: Forced transfers require a power interruption to the load of 0.8 seconds. Ensure that the connected load can tolerate a brief outage before initiating a forced transfer.

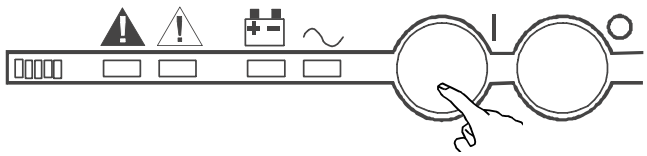
1. On the hidden panel, hold down the **Security** key while pressing the **Forced shutdown** key (inverter to bypass).
   The load will be disconnected for 0,8 seconds; then the load will be connected to the bypass source.



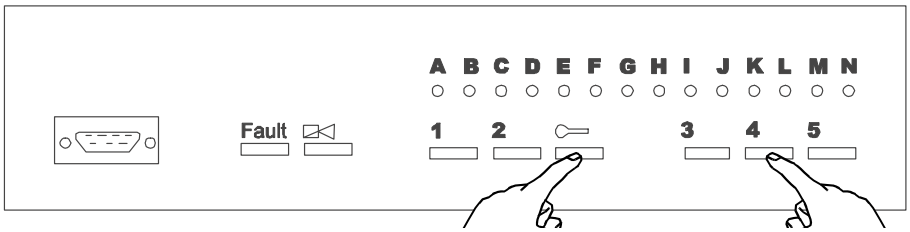
Forced Transfer from Static Bypass Operation to Normal Operation

Caution: Forced transfers require a power interruption to the load of 0.8 seconds. Ensure that the connected load can tolerate a brief outage before initiating a forced transfer.

1. Press the **Inverter on** key on the front panel. The inverter will start but will not yet couple to the load.



2. On the hidden panel, hold down the **Security** key while pressing the **Forced transfer** (bypass to inverter) key. The load will be disconnected for 0,8 seconds, then connected to the inverter.



Maintenance

Preventive Maintenance

We recommend that preventive maintenance of the MGE EPS 7000 and MGE EPS 8000 Systems is performed twice a year. Your installation and site may require additional preventive maintenance to ensure optimal performance.

WARNING: Preventive maintenance must only be performed by qualified personnel.

Parts Replacement

There are no user-replaceable parts in the MGE EPS 7000 and MGE EPS 8000 Systems.

Three levels of replacement parts are available for the MGE EPS 7000 and MGE EPS 8000 Systems.

Level	Description
A	This level of replacement parts consists of consumable parts, specifically fuses and air filters. It is recommended to have these parts on hand during installation of the UPS system, including initial start-up.
B	This level of replacement parts is recommended when the user can tolerate short-duration UPS down-time to obtain replacement parts in the event of a major UPS failure. This level of replacement parts consists of consumable parts, special fuses, air filters, an inverter leg, and the most critical circuit board assemblies.
C	This level of replacement parts is recommended when the user can tolerate only a minimum of down-time in the event of a major UPS failure. This level of replacement parts consists of consumable parts, special fuses, air filters, an inverter leg, and a complete set of circuit board assemblies.

Having replacement parts on hand will prevent any delays (due to time involved in obtaining spare parts) during critical periods such as system start-up.

Any parts used during start-up will be replaced by APC by Schneider Electric at no charge. Contact Customer Support for specific recommendations.

Troubleshooting

Audible Alarms

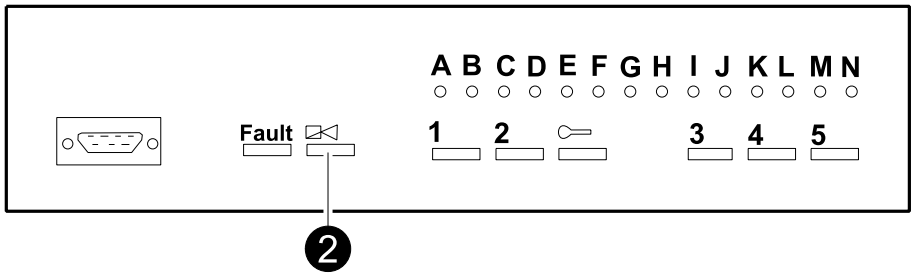
The following alarm conditions activate the audible alarm:

- Load transferred to bypass.
- Load supplied via battery.
- Operating problem.

During minor alarm conditions, the alarm sounds at a slow rate and a low sound level. When the battery approaches a low-voltage shutdown level, the alarm sounds louder and at an increased level. If the inverter shuts down, the alarm is loud and continuous.

Silence the Alarm

1. Open the cover plate to get access to the hidden panel.
2. Press the **Audible alarm reset** key.

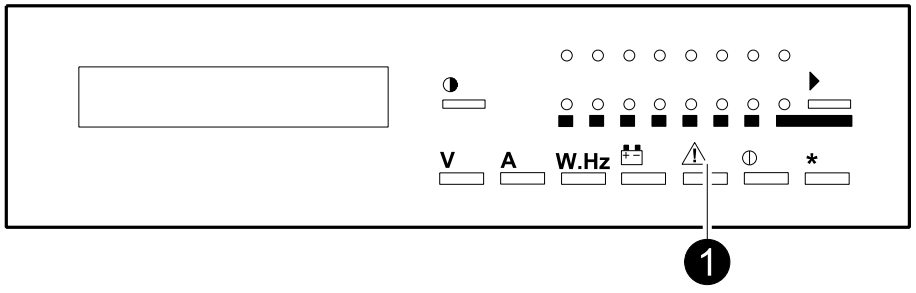


Status and Alarm Messages on the User Interface

When an alarm condition is present, the display will present a general alarm message. To determine the cause of the alarm, view the list of current alarms.

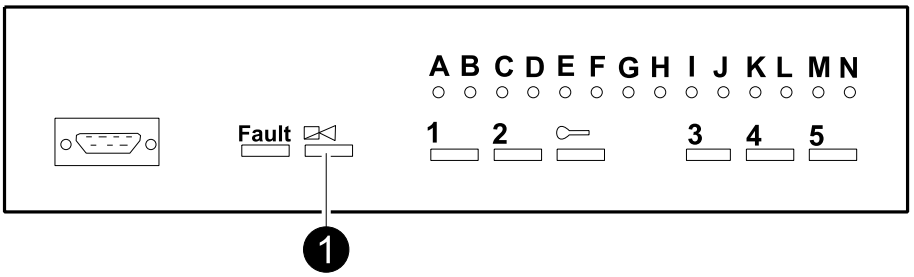
View List of Current and Stored Alarms

1. Press the **Alarm** key repeatedly to scroll through the list of alarms. If a blinking (!) appears in the display, press the **Alarm** key again to scroll through additional information.



Reset the Alarm List

1. Press the **Clear faults** key on the hidden panel.



List of Alarm Messages

General Alarms

LOW LEVEL ALARM UPS OK !	A problem requiring action has occurred. The load is still supplied by the inverter. The problem is listed in the secondary alarm message, as indicated by the flashing (!). Press the alarm key to view the message.
UPS INPUT FAILURE LOAD ON BATTERY !	The AC input has failed or is outside of tolerance, and power to the inverter is being supplied by the battery system. The load is still supplied by the inverter.
REMAINING BAT. TIME __ MN %KW LOAD = __	This message is automatically displayed every five seconds when the UPS is on battery. It alternates with the previous message. The message provides an estimate of the available remaining runtime, based on the percentage of full rated load being supplied, the type of battery, the battery temperature, and the battery age.
UPS LOW BATTERY SHUTDOWN IMMINENT!	The batteries have reached the "low battery shutdown" warning level. Prepare the load for shutdown. This message appears when there are only a few minutes of battery back-up time remaining.
UPS ALARM CALL SERVICE !	Indicates that a major fault has occurred in the UPS. The problem is listed in the secondary alarm message, as indicated by the flashing (!). Press the alarm key to view the message.

Secondary Alarms

EMERGENCY SHUT DOWN REPO ON !	The UPS has been shut down because a remote emergency power off (REPO) has been pressed and is still closed.
LOAD ON BYPASS !	The load has been transferred to AC bypass source. The load is no longer protected.
BYPASS PROBLEM CHECK FREQUENCY !	The AC bypass source is out of frequency tolerance. The inverter has switched to free-running mode. Transfer of the load from the inverter output to the AC bypass source requires an interruption to the load.
BYPASS PROBLEM CHECK VOLTAGE !	The AC bypass source is out of voltage tolerance. The inverter has switched to free-running mode. Transfer of the load from the inverter output to the AC bypass source requires an interruption to the load.
INDEPENDENT INVERTER FREQ. COMMAND ON !	The inverter has been set to free-running mode. The inverter is not synchronized with the AC bypass source. Transfer of the load from the inverter output to the AC bypass source requires an interruption to the load.

BYPASS TRANSFER LOCKOUT COMMAND ON !	The UPS has been set not to transfer from the inverter to the AC bypass source. In the event of an inverter shutdown, the load will be disconnected.
BATTERY CABINET OVERTEMP. !	The ambient temperature of the battery is out of tolerance.
UPS INPUT PROBLEM CHECK FREQUENCY !	The AC input source frequency is out of tolerance. The rectifier/battery charger has shut down, and the inverter is supplied from the batteries.
UPS INPUT PROBLEM CHECK VOLTAGE !	The AC input source voltage is out of tolerance. The rectifier/battery charger has shut down, and the inverter is supplied from the batteries.
CHARGER SHUTDOWN COMMAND ON !	The rectifier/battery charger has been instructed to shut down, for example during progressive (stepped) transfer to a motor-generator set.
INPUT KVA LIMITED COMMAND ON !	The rectifier/battery charger has been instructed to limit the power drawn from the AC input source. The condition occurs when the load is being supplied by an undersized motor-generator set; the battery source is called upon to make up the difference.
BATTERY CURRENT LIMIT COMMAND ON !	The rectifier/battery charger has been instructed to limit the charge current to the battery. Normal charge current to the battery will be supplied when the command is released. The condition occurs when the load is being supplied by an undersized motor-generator set.
QF1 BATTERY BREAKER OPEN	The battery breaker (QF1) has been opened or has tripped. The load is no longer protected since battery power is unavailable.
LOW BATTERY. . . !	The inverter has shut down due to depletion of the batteries' stored energy.
CHARGER OFF. . . !	The rectifier/battery charger has shut down.
CHARGER FAULT CALL SERVICE !	There is a fault in the rectifier/battery charger, and service is required.
Q1 UPS INPUT CB OPEN !	The input isolation circuit breaker is open or has tripped. It must be closed for rectifier/battery charger start-up.
INVERTER OVERLOAD CHECK P.F. AND KW	The inverter is in an overload condition, usually due to excessive real power (kW) being drawn by the load. The flashing "kW" indicates that you must check the load real power. The inverter will keep supplying the load for a certain amount of time depending on the overload level.
INVERTER FAULT CALL SERVICE !	There is a fault in the inverter, and service is required.
INVERTER SHUTDOWN OVERLOAD > I MAX!	An overload condition greater than 1.5 times the full power rating of the inverter has occurred, and the inverter has shut down.
INVERTER SHUTDOWN THERMAL OVERLOAD A	An overload condition below 1.5 times the full power rating of the inverter has occurred, and the inverter has shut down. The flashing "A" indicates that you should check the load current.
I LOAD > IN CHECK LOAD A	The load power being drawn is greater that the UPS full load rating. The flashing "A" indicates that you must check the load current. The inverter or the static switch will keep supplying the load for a certain amount of time depending on the overload level.
TRANSFER FAULT CALL SERVICE !	A fault has occurred that affects the transfer of the load between the inverter and the bypass source. Service is required.

PH OUT OF TOLERANCE!	There is an out of tolerance condition between the inverter and the AC bypass source. Transfer of the load between the inverter and AC bypass source will result in an interruption of the load power.
Q4S BYPASS SWITCH OPEN !	The static bypass input breaker (Q4S) is open. Transfer of the load from the inverter to the AC bypass source is not possible.
Q5N UPS OUTPUT ISOL. SWITCH OPEN !	The optional UPS/system output breaker (Q5N) is open. The load is not supplied unless the maintenance bypass circuit breaker Q3BP is closed.
Q3BP MAINT. BYPASS SWITCH CLOSED	The optional maintenance bypass circuit breaker (Q3BP) is closed. The system is set to maintenance bypass, and the load is supplied by the AC bypass source.
STATIC SWITCH O.L. EMERGENCY OFF !	The static switch has shut down following an overload condition, and the load has been disconnected.
DISPLAY NUMBER 1 UNAVAILABLE	The alphanumeric display is not operating properly. The status of the UPS is still correctly indicated by the LEDs of the visible panel and the hidden panel.
HARMONIC FILTER FUSE FAILED	The fuse(s) protecting the input harmonic filter has opened, and service is required. The status of the UPS is still correctly indicated by the LEDs of the visible panel. The load is still supported.
BATTERY CHARGING !	The batteries are being recharged.
INDEPENDENT INVERTER FREQUENCY !	The inverter is operating in free-running mode, and is no longer synchronized with the AC bypass source. The inverter frequency is stable and within 0.1 Hz, but transfer of the load to the AC bypass source is not possible without an interruption of power to the load.
NUMBER OF MODULES READY INSUFFICIENT !	The load cannot be transferred from the AC bypass source to the UPS modules as an insufficient number of UPS modules have been started up.
UPS TRANSFER LOCKOUT !	The load cannot be transferred from the inverter to the AC bypass source without interruption of power to the load for one of the following reasons: • The conditions for transfer are not met. • The inverter is operating in free-running mode. • The inverter is in current limit. • The UPS has been commanded not to transfer without interruption. • There is an internal fault.
FAN FAILURE CALL SERVICE !	A fan has failed, and service is required. The rectifier/battery charger fans and inverter fans are redundant, so the load is still supported.
AUXILIARY CABINET FAULT CALL SERVICE !	There is a fault in an auxiliary cabinet, and service is required.
CALL SERVICE FOR BATTERY PM !	The battery has reached its end-of-life (based in rated lifetime and the condition of use).
MODULE NUMBER X UNAVAILABLE	The core controller of the selected module (UPS or SSC) is not sending data to the alphanumeric display. The module status is still correctly indicated by the LEDs of the visible and hidden panel.

MODULE NUMBER X FAULT	The core controller of the selected module (UPS or SSC) is sending invalid data to the alphanumeric display. The module status is still correctly indicated by the LEDs of the visible and hidden panel.
DISPLAY NUMBER X UNAVAILABLE	The alphanumeric display is not operating properly. The status of the UPS module or SSC is correctly indicated by the LEDs of the visible and hidden panel.

Status and Alarm Messages on the Graphical User Interface

Set the Alarm Delay

Note: You must have entered the identification setup screen to continue.

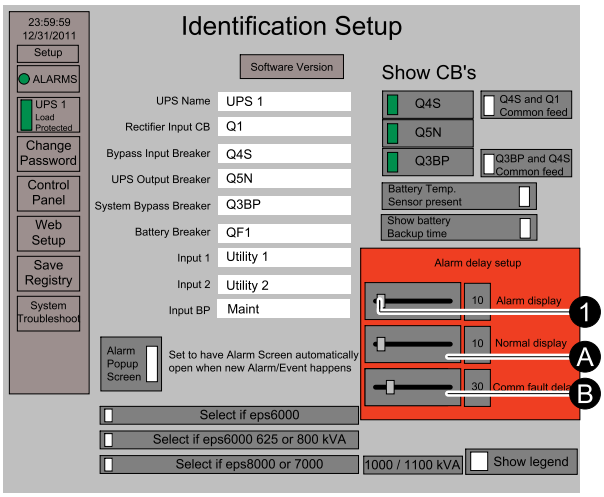
The example below shows the setup of Alarm delay for the single module screen. For Parallel systems, you must be on the System configuration screen.

Alarm delay sets the amount of time (in seconds) before an active alarm will be logged.

1. Slide the **Cursor** to the needed value (in seconds).

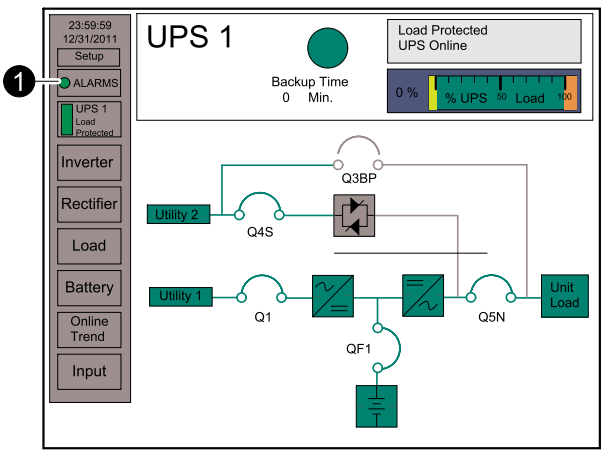
   A. Sets the amount of time (in seconds) before an inactive logged alarm will return to normal.

   B. Sets the amount of time (in seconds) before a communication delay is logged as faulted.



View Active Alarms and Events

1. On the Main Menu screen, click the **ALARMS** button.

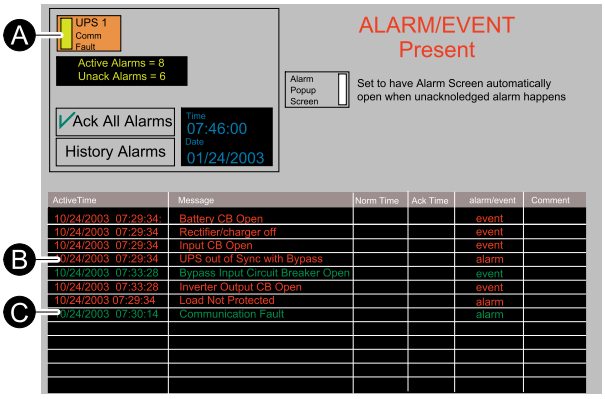


2. The ALARM/EVENT Present screen shows the following information:

   A. Selected UPS

   B. Unacknowledged alarms

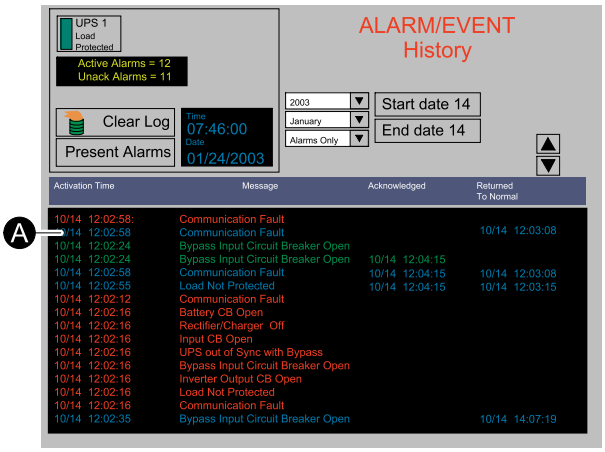
   C. Acknowledged alarms



View Historical Alarms

1. On the ALARM/EVENT Present screen, press the **History Alarms** button
2. Historical alarms which have returned to normal will be shown in blue.

   A. Alarm returned to normal



Filter Alarms

1. You can set the following filter parameters:

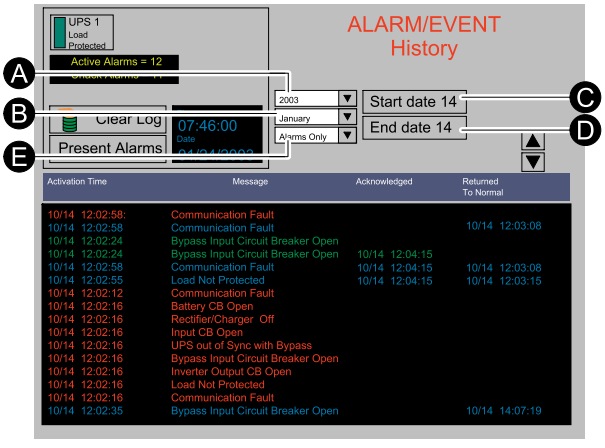
   A. Year

   B. Month

   C. Start date

   D. End date

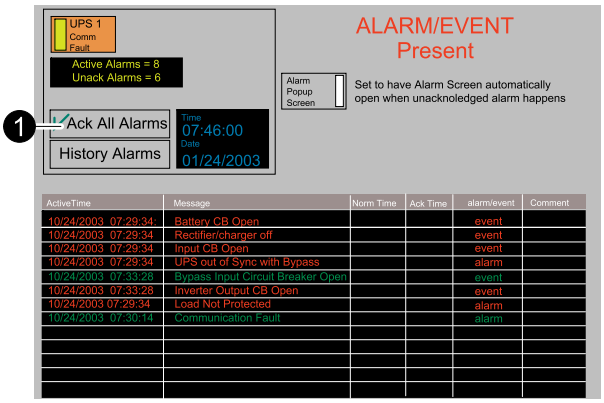
   E. Selected filter: alarms only, events only, or alarms and events.



Acknowledge All Alarms

You must be in the ALARM/EVENT Present screen

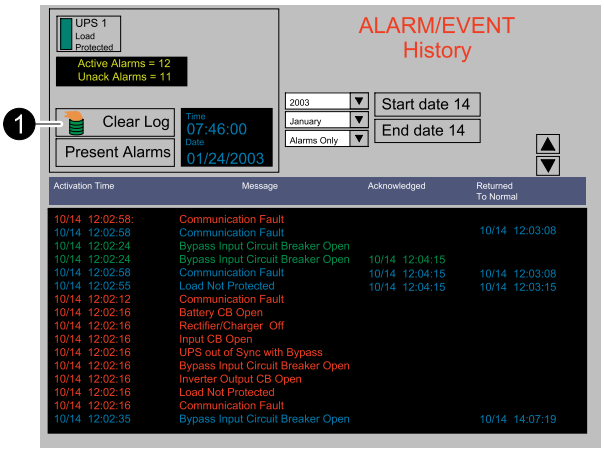
1. On the ALARM/EVENT Present screen, press the **Ack all alarms** button to acknowledge all active alarms.



Clear Alarm Log

You need to enter the password to perform this action.

1. On the ALARM/EVENT History screen, press the **Clear log** button.
2. Enter the password in the **Password** field.
3. Press the **Enter** button.
4. Press the **Clear log** button.



Worldwide Customer Support

Customer support for this or any other product is available at no charge:

- Contact the Customer Support Center by telephone or e-mail. For local, country-specific centers: go to www.apc.com/support/contact for contact information.

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